# RESULTS OF SURGICAL TREATMENT OF PTOSIS OF THE UPPER EYELID BY THE DOSED MUSCLE-CONJUNCTIVAL RESECTION OF THE UPPER CARTILAGE

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## ABSTRACT

*Blepharoptosis is an abnormally low position of the upper eyelid in relation to the eyeball due to its omission. The method of surgical treatment of blepharoptosis depends on the function of the levator.*

***The aim.*** *To analyze the results of surgical treatment of partial blepharoptosis of various etiology by the dosed muscle-conjunctival resection of the upper eyelid cartilage.*

***Material and methods.*** *We operated 78 patients (82 eyes) with blepharoptosis. Among them with congenital blepharoptosis – 34 people (36 eyes), with acquired – 44 (46 eyes). The patients' age was from 6 to 82 years.*

*Inclusion criteria: the function of the upper eyelid levator – more than 5 mm, the width of the palpebral fissure – 3 mm or more.*

*The patients underwent a dosed muscle-conjunctival resection of the upper eyelid cartilage in the period from 2018 to 2021. The follow-up period ranged from 2 months to 2 years.*

***Results.*** *Elimination of blepharoptosis was achieved in all patients. With congenital blepharoptosis, a good result was obtained in 33 people (91.7 %), satisfactory – in three patients (8.3 %), which was associated with the asymmetry of the palpebral fissure, for the correction of which these patients underwent additional intervention. In patients with acquired ptosis of the upper eyelid, a good result was achieved in 91.3 % of cases (42 eyes). One patient underwent repeated surgery due to hypocorrection and asymmetry of the palpebral fissure width after the first surgery.*

*In all patients, the result remained stable throughout the observation period.*

***Conclusion.*** *The use of the method of dosed muscle-conjunctival resection of the upper eyelid cartilage in patients with partial ptosis of the upper eyelid and intact levator function made it possible to obtain a good cosmetic and functional result: with congenital blepharoptosis – in 91.7 % of cases, acquired ptosis of the upper eyelid – in 91.3 % patients.*

***Key words:*** *upper eyelid ptosis, cartilage resection, blepharoptosis, upper eyelid levator function*

Received: 06.09.2021
Accepted: 06.06.2022
Published: 02.03.2023

**For citation:** Bikbov M.M., Ishbulatov R.Sh., Lukyanova E.E. Results of surgical treatment of ptosis of the upper eyelid by the dosed muscle-conjunctival resection of the upper cartilage. *Acta biomedica scientifica*. 2023; 8(1): 134-139. doi: 10.29413/ABS.2023-8.1.15

# РЕЗУЛЬТАТЫ ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ ПТОЗА ВЕРХНЕГО ВЕКА МЕТОДОМ ДОЗИРОВАННОЙ МЫШЕЧНО-КОНЪЮНКТИВАЛЬНОЙ РЕЗЕКЦИИ ХРЯЩА ВЕРХНЕГО ВЕКА

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## РЕЗЮМЕ

*Блефароптоз – аномально низкое положение верхнего века по отношению к глазному яблоку вследствие его опущения. Метод хирургического лечения блефароптоза зависит от функции леватора.*

***Цель исследования**: анализ результатов хирургического лечения частичного блефароптоза различной этиологии методом дозированной мышечно-конъюнктивальной резекции хряща верхнего века.*

***Материал и методы**. Прооперировано 78 пациентов (82 глаза). Врождённый блефароптоз был у 34 человек (36 глаз), приобретённый – у 44 (46 глаз). Возраст пациентов – от 6 до 82 лет. Критерии включения: функция леватора верхнего века более 5 мм, ширина глазной щели 3 мм и более. Пациентам проведена дозированная мышечно-конъюнктивальная резекция хряща верхнего века в период с 2018 по 2021 г. Срок наблюдения – от 2 месяцев до 2 лет.*

***Результаты**. У всех пациентов достигнуто устранение блефароптоза. При врождённом блефароптозе хороший результат был получен в 33 случаях (91,7 %), удовлетворительный – у трёх пациентов (8,3 %), что было связано с асимметрией глазной щели, для коррекции которой данным больным проведено дополнительное вмешательство.*

*У пациентов с приобретённым блефароптозом хороший результат достигнут в 91,3 % случаев (42 глаза). Одному больному проведено повторное хирургическое вмешательство вследствие гипокоррекции и асимметрии ширины глазной щели.*

*У всех пациентов результат оставался стабильным на протяжении всего срока наблюдения.*

***Заключение.** Применение дозированной мышечно-конъюнктивальной резекции хряща верхнего века у пациентов с частичным птозом верхнего века и сохранной функцией леватора позволило получить хороший косметический и функциональный результат: при врождённом блефароптозе – в 91,7 % случаев, приобретённом – в 91,3 %.*

***Ключевые слова**: птоз верхнего века, резекция хряща, блефароптоз, функция леватора верхнего века*

Статья получена: 06.09.2021
Статья принята: 06.06.2022
Статья опубликована: 02.03.2023

**Для цитирования:** Бикбов М.М., Ишбулатов Р.Ш., Лукьянова Е.Э. Результаты хирургического лечения птоза верхнего века методом дозированной мышечно-конъюнктивальной резекции хряща верхнего века. *Acta biomedica scientifica*. 2023; 8(1): 134-139. doi: 10.29413/ABS.2023-8.1.15

## RELEVANCE

Ptosis of the upper eyelid (blepharoptosis) is an abnormal drooping of the upper eyelid due to insufficient function of the muscle that raises the upper eyelid (levator) [1]. Blepharoptosis is one of the most common congenital ophthalmopathologies. Drooping of the upper eyelid is not only a significant cosmetic defect, but can also be the cause of such serious conditions as obscuration amblyopia, strabismus, binocular vision disorder, postural disorder, abnormal head posture [2–4].

During the treatment of ptosis of the upper eyelid, conservative methods practically do not give any results. Surgical treatment of blepharoptosis is the most effective [5, 6]. The choice of the method of surgical treatment of ptosis of the upper eyelid depends on the function of the levator. Resection of the muscle that raises the upper eyelid is performed if the function of the muscle is reduced, but intact, a suspension-type surgery is performed in case of its absence.

Currently, the literature describes many methods of surgical treatment of ptosis of the upper eyelid, such as transcutaneous resection of the muscle lifting the upper eyelid, shortening of the levator by performing reduplication, suspension of the muscle lifting the upper eyelid to the frontal muscle using various materials for suspension [7, 8]. In particular, a group of authors proposed a method of surgical treatment of blepharoptosis consisting of dosed muscle-conjunctival resection of the upper eyelid cartilage [1, 9–11]. Despite the development of numerous methods and types of surgery aimed at correcting the upper eyelid drooping, none of the methods can completely solve the problem of this condition. In this regard, it seems appropriate to evaluate the results of surgical treatment of partial blepharoptosis of various etiology by this method.

## THE AIM OF THE STUDY

To analyze the results of surgical treatment of partial blepharoptosis of various etiology by the dosed muscle-conjunctival resection of the upper eyelid cartilage.

## MATERIAL AND METHODS

78 patients (82 eyes) with the upper eyelid ptosis of various etiology were operated: among them with congenital blepharoptosis – 34 people (36 eyes), with acquired – 44 people (46 eyes). 74 patients had unilateral upper eyelid ptosis, 4 patients – bilateral. 23 patients (23 eyes) had mild blepharoptosis, 55 people (59 eyes) – moderate [12]. According to the degree of the upper eyelid drooping, the groups of patients with congenital and acquired ptosis were comparable. The patients' age was from 6 to 82 years.

Inclusion criteria: the function of the upper eyelid levator – more than 5 mm, the width of the palpebral fissure – 3 mm or more. Exclusion criteria: the function of the upper eyelid levator – 5 mm or less, the width of the palpebral fissure – less than 3 mm, inflammatory eye conditions.

The patients underwent a standard preoperative ophthalmological examination, including visometry, biomicroscopy, ophthalmoscopy, tonometry, keratometry and refractometry. The width of the palpebral fissure, the height of the upper eyelid relative to the pupil, the function of the upper eyelid levator were also determined; MRD1 (marginal reflex distance 1) was evaluated, the presence or absence of the Bell's phenomenon (deviation of the eyeballs upward when closing the eyelids) was determined. The amplitude of the upper eyelid movement was measured in millimeters, when looking up or down as much as possible, with and without the frontal muscle fixation by a linear method in order to determine the function of the muscle that raises the upper eyelid. Surgical treatment of the patients was carried out in the period from 2018 to 2021. The follow-up period ranged from 2 months to 2 years.

Elimination of blepharoptosis was carried out by the method of the dosed muscle-conjunctival resection of the upper eyelid cartilage. Dosing was carried out depending on the function of the levator and the level of the upper eyelid margin in relation to the limbus.

**The surgery technique**. The upper eyelid is turned out, the level of resection of the cartilage of the upper eyelid cartilage is marked. The cartilage forceps is applied. The conjunctiva, cartilage of the upper eyelid, levator, Müller's muscle from the temporal part to the nasal part and in the opposite direction is stitched with Vicryl 6/0 U-shaped sutures. The ends of the suture are displayed on the skin of the temporal area. The distance from the sutures to the forceps shall not be more than 1 mm. The tissues of the upper eyelid (conjunctiva, upper eyelid cartilage, upper eyelid lifting muscle, Müller's muscle), fixed between the branches of the forceps, are excised according to the marking. A continuous Vicryl 6/0 suture is applied to the resected margin of the cartilage.

In the postoperative period, patients underwent antibacterial, anti-inflammatory treatment, ointment keratoprotectors were used to prevent the development of keratopathy.

The effectiveness of the surgical treatment in the postoperative period was assessed by the level of the upper eyelid margin in relation to the pupil. With unilateral ptosis, the result was considered good if the width of the palpebral fissure became symmetrical, and satisfactory – with a difference in the width of the palpebral fissure up to 1.0–1.5 mm. In bilateral blepharoptosis, the result was good when the position of the upper eyelid was at the level of the upper limbus or above the upper margin of the pupil, and the width of the palpebral fissure in both eyes was symmetrical. The result was considered satisfactory if the upper eyelid was located at the level of the upper margin of the pupil.

Statistical processing of the analyzed data was performed using the Statistica program, version 8.0 (Stat-

**TABLE 1**

**ASSESSMENT OF THE FUNCTION OF THE LEVATOR OF THE UPPER EYELID BEFORE AND AT DIFFERENT TIMES AFTER SURGERY (MRD1)**

| | MRD1 (1 mm) | | | | Upper eyelid excursion (mm) | | | |
|---|---|---|---|---|---|---|---|---|
| | Before treatment | After treatment | | | Before treatment | After treatment | | |
| | | 1m | 6m | 12m | | 1m | 6m | 12m |
| Congenital ($n$ = 36) | 1.8 ± 0.7 | 4.9 ± 0.9* | 4.8 ± 0.7* | 4.9 ± 0.8* | 8,1 ± 1,2 | 14.3 ± 1.4* | 14.2 ± 1.2* | 14.4 ± 1.1* |
| Acquired ($n$ = 46) | 1.2 ± 0.8 | 4.6 ± 0.7* | 4.5 ± 0.8* | 4.4 ± 0.7* | 7.2 ± 0.9 | 14.0 ± 1.0* | 14.1 ± 0.9* | 14.0 ± 1.2* |

**Note.** $n$ – the number of eyes; * – $p < 0.05$ compared to the indicators before treatment.

Soft Inc., USA). The result was considered statistically significant when the probability of the type 1 error was $p < 0.05$.

## RESULTS AND DISCUSSION

As a result of surgical treatment, elimination of blepharoptosis was achieved in all patients. In the early postoperative period, in 82.9 % of cases (68 eyes), lagophthalmos within 1–2 mm was noted, which was stopped within 1–2 months. The folds of the upper eyelids were pronounced and symmetrical.

Good result was achieved in 33 people (91.7 %) after surgical correction of congenital ptosis of the upper eyelid. In all cases, an increase in MRD1 indicators was noted in the postoperative period – on average up to 4.9 mm a year after surgery (Table 1). The width of the palpebral fissure increased to 10–12 mm, symmetrically to the healthy eye, the upper eyelid excursion improved to 14.3 mm (on average by 4–6 mm). The result was satisfactory in 3 (8.3 %) patients, which was due to the asymmetry of the palpebral fissure in comparison with the healthy eye. These patients underwent additional intervention to eliminate the asymmetry of the palpebral fissures in the late postoperative period.

A good result was achieved in 91.3 % of cases (42 eyes), satisfactory – in 8.7 % in the group of patients with acquired ptosis of the upper eyelid. MRD1 increased to an average of 4.4 mm after 12 months. The excursion of the upper eyelid was 14.0 mm, the width of the palpebral fissure increased to 11–12 mm and was the healthy eye. One patient was diagnosed with keratopathy due to a violation of compliance and non-compliance with the postoperative regime, which was stopped after a course of conservative therapy. One patient underwent repeated surgical intervention due to hypocorrection and asymmetry of the width of the palpebral fissure after the first surgery.

In both groups, there was an increase in levator function, an increase in the upper eyelid excursion to an average of 14.4 ± 1.1 mm in patients with congenital ptosis of the upper eyelid and up to 14.0 ± 1.2 mm in the group of patients with acquired blepharoptosis, the width of the palpebral fissure was symmetrical and amounted to 10–12 mm.

In all patients, the result remained stable throughout the observation period.

Performing dosed muscle-conjunctival resection of the upper eyelid cartilage in patients with partial upper eyelid ptosis and upper eyelid levator function of more than 5 mm allowed us to obtain a good postoperative result. This method is unlikely to be applied in patients with sharply reduced or absent function of the muscle that raises the upper eyelid, since this will not lead to the target result. When choosing a method of surgical treatment of patients with blepharoptosis, it is necessary to use a differentiated approach, and the assessment of levator function should be an integral part in the examination of patients with blepharoptosis.

## CONCLUSION

The use of the method of dosed muscle-conjunctival resection of the upper eyelid cartilage in patients with partial ptosis of the upper eyelid and intact levator function made it possible to obtain a good functional and cosmetic result in congenital and acquired blepharoptosis in 91 % of cases.

**Financing**

The study was carried out with the financial support of Ufa Eye Research Institute.

**Conflict of interest**

The authors of this article declare the absence of a conflict of interest and any commercial or financial relations.

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The article was published as part of the All-Russian Scientific and Practical Conference with International Participation "VIII Baikal Ophthalmological Readings "Visualization in ophthalmology. Present and future".